## CLAIM AMENDMENTS

1. 1. (Currently Amended)  A computer-implemented method of allocating storage to a host
2. processor, comprising:
3. a control processor receiving a request to allocate storage to the host processor; and
4. the control processor associating one or more logical units from among one or more
5. storage units to the host processor by:
6. the control processor configuring a gateway device to map the one or more
7. logical units to the host processor;
8. the control processor configuring the one or more storage units to give the host
9. processor access to the one or more logical units; and
10. wherein the host processor does not determine which one or more logical units are
11. associated with the host processor.
12. ~~wherein the control processor is separate from the gateway device, the host~~
13. ~~processor, and the one or more storage units; and~~
14. ~~wherein the gateway device is separate from the control processor, the host~~
15. ~~processor, and the one or more storage units.~~

1. 2. (Currently Amended)  A method as recited in Claim 1, wherein:
2. ~~the configuring steps~~ the control processor configuring the gateway device and the
3. control processor configuring the one or more storage units are performed by
4. the control processor without modification to an operating system of the host
5. processor;
6. the gateway device is included in a virtual storage layer;
7. the host processor and the one or more storage units are included in a virtual server
8. farm;
9. ~~the control processor configures the gateway device to map the one or more logical~~
10. ~~units to a boot port of the host processor;~~
11. the control processor is coupled through one or more storage networks to a plurality of
12. storage gateways that includes the gateway device; and

13      the plurality of storage gateways are coupled through the storage networks to the one

14             or more storage units.

1    3.-6.   (Cancelled)

1    7.    (Currently Amended)  A method as recited in Claim 1, further comprising:

2       the control processor causing the storage of first information that associates <u>host</u>

3             processors to logical units;

4       the control processor causing the storage of second information that associates logical

5             units to storage units<u>:</u>[[:]] ~~and~~

6       the <u>control processor</u> associating ~~step~~ <u>the one or more logical units from among the</u>

7             <u>one or storage units to the host processor</u> further comprises the control

8             processor mapping the one or more logical units from among the one or more

9             storage units to a boot port of the host processor by reconfiguring the gateway

10           device to logically couple the one or more logical units to the boot port based

11           on the stored first information and the stored second information<u>;</u>

12      <u>the control processor identifying one or more logical unit numbers (LUNs)</u>

13           <u>corresponding to the one or more logical units;</u>

14      <u>the control processor instructing the gateway device to map the one or more LUNs to</u>

15           <u>the small computer system interface (SCSI) port zero of the host processor</u>

16           <u>based on a unique processor identifier; and</u>

17      <u>the control processor instructing the one or more storage units to give the host</u>

18           <u>processor having the unique host identifier access to the one or more LUNs.</u>

1    8.    (Currently Amended)  A method as recited in Claim 1<u>, wherein the request to allocate</u>

2       <u>storage to the host processor is a first request to allocate storage to the host processor,</u>

3       <u>and the method</u> further ~~comprising~~ <u>comprises</u>:

4       <u>based on the first request,</u> the control processor generating ~~the~~ <u>a second</u> request to

5             allocate storage<u> to the host processor</u>;

6       wherein the control processor is communicatively coupled to a control database;

7      wherein the <u>second</u> request is directed from the control processor to a storage

8         manager; ~~and~~

9      wherein the storage manager is communicatively coupled to the control processor, the

10        control database, and a storage network that includes the gateway device<u>; and</u>

11      <u>the method further comprises the control processor causing the storage manager to</u>

12        <u>issue instructions to the one or more storage units to give the host processor</u>

13        <u>access to the one or more logical units.</u>

1    9.     (Cancelled)

1    10.    (Currently Amended) A method as recited in Claim 1, wherein <u>the request to allocate</u>

2       <u>storage specifies a first amount of storage, and wherein</u> the <u>control processor</u>

3       associating ~~step~~ <u>the one or more logical units</u> further comprises:

4       the control processor identifying the one or more logical units (LUNs) of the one or

5         more storage units that<u>, when combined,</u> have a ~~sufficient~~ <u>second</u> amount of

6         storage ~~to satisfy~~ <u>that is at least as great as the first amount of storage specified</u>

7         <u>in</u> the request[[;]]<u>.</u>

8       ~~the control processor instructing the gateway device to map the identified LUNs to the~~

9         ~~small computer system interface (SCSI) port zero of the host processor based~~

10        ~~on a unique processor identifier; and~~

11       ~~the control processor instructing the one or more storage units to give the host~~

12         ~~processor having the unique host identifier access to the identified LUNs.~~

1   11.   (Currently Amended)  A method as recited in Claim 1, wherein the request is a first

2         request, and the <u>control processor</u> associating ~~step~~ <u>the one or more logical units</u> further

3         comprises:

4         the control processor issuing a second request to allocate one or more volumes on one

5               of the one or more storage units;

6         the control processor issuing a third request to make a concatenated volume using the

7               one or more allocated volumes;

8         the control processor causing the concatenated volume to be configured for use with

9               the host processor;

10        the control processor issuing first instructions to the one or more storage units to bind

11              the host processor to the concatenated volume by giving the host processor

12              access to the concatenated volume;

13        the control processor issuing second instructions to the gateway device to bind the

14              concatenated volume to the host processor.

1   12.   (Previously Presented)  A method as recited in Claim 11, further comprising:

2         the control processor determining that the second instructions have failed to bind the

3              concatenated volume to the host processor;

4         the control processor issuing third instructions to the one or more storage units to

5              un-bind the host processor from the concatenated volume;

6         the control processor determining that the first instructions have failed to bind the host

7              processor to the concatenated volume; and

8         the control processor issuing fourth instructions to the one or more storage units to

9              break the concatenated volume.

1   13.   (Cancelled)

1   14.   (Cancelled)

1    15.    (Currently Amended)  A method as recited in Claim 1, wherein:

2    the one or more logical units associated with the host processor include at least a first

3        logical unit from a first volume of a first storage unit of the one or more

4        storage units and at least a second logical unit from a second volume of a

5        second storage unit of the one or more storage units;

6    the request to allocate storage specifies a parameter selected from the group consisting

7        of an amount of storage to be allocated and a type of storage to be allocated;

8    the control processor is separate from the gateway device, the host processor, and the

9        one or more storage units; and

10    the gateway device is separate from the control processor, the host processor, and the

11        one or more storage units.

1    16.–39.  (Cancelled)

1    40.    (Currently Amended)  A computer-readable medium for allocating storage to a host

2    processor, the computer-readable medium carrying one or more sequences of

3    instructions which, when executed by one or more processors, cause the one or more

4    processors to carry out the steps of:

5    ~~the~~ a control processor receiving a request to allocate storage to the host processor; and

6    the control processor associating one or more logical units from among one or more

7        storage units to the host processor by:

8        the control processor configuring a gateway device to map the one or more

9            logical units to the host processor:

10        the control processor configuring the one or more storage units to give the host

11            processor access to the one or more logical units; and

12        wherein the host processor does not determine which one or more logical units

13            are associated with the host processor.

14        ~~wherein the control processor is separate from the gateway device, the host~~

15            ~~processor, and the one or more storage units; and~~

16          ~~wherein the gateway device is separate from the control processor, the host~~

17          ~~processor, and the one or more storage units~~.

1   41.   (Currently Amended) A computer-readable medium as recited in Claim 40, wherein:

2         ~~the configuring steps~~ the control processor configuring the gateway device and the

3         control processor configuring the one or more storage units are performed by

4         the control processor without modification to an operating system of the host

5         processor;

6   the gateway device is included in a virtual storage layer;

7   the host processor and the one or more storage units are included in a virtual server

8         farm;

9   ~~the control processor configures the gateway device to map the one or more logical~~

10         ~~units to a boot port of the host processor;~~

11   the control processor is coupled through one or more storage networks to a plurality of

12         storage gateways that includes the gateway device; and

13   the plurality of storage gateways are coupled through the storage networks to the one

14         or more storage units.

1   42.   (Currently Amended) A computer-readable medium as recited in Claim 40, further

2         comprising one or more sequences of instructions which, when executed by the control

3         one or more processors, cause the one or more processors to carry out the steps of:

4         the control processor causing the storage of first information that associates host

5         processors to logical units;

6         the control processor causing the storage of second information that associates logical

7         units to storage units; ~~and~~

8         the instructions for the control processor associating the one or more logical units from

9         among the one or storage units to the host processor further comprise one or

10         more sequences of instructions which, when executed by the one or more

11         processors, cause the one or more processors to carry out the step of the control

12         processor mapping the one or more logical units from among the one or more

13         storage units to a boot port of the host processor by reconfiguring the gateway

14        device to logically couple the one or more logical units to the boot port based

15        on the stored first information and the stored second information;

16    the control processor identifying one or more logical unit numbers (LUNs)

17        corresponding to the one or more logical units;

18    the control processor instructing the gateway device to map the one or more LUNs to

19        the small computer system interface (SCSI) port zero of the host processor

20        based on a unique processor identifier; and

21    the control processor instructing the one or more storage units to give the host

22        processor having the unique host identifier access to the one or more LUNs.

1    43.    (Currently Amended)  A computer-readable medium as recited in Claim 40, wherein

2    the request to allocate storage to the host processor is a first request to allocate storage

3    to the host processor, and the computer-readable medium further ~~comprising~~

4    comprises one or more sequences of instructions which, when executed by the one or

5    more processors, cause the one or more processors to carry out the step of:

6    based on the first request, the control processor generating ~~the~~ a second request to

7        allocate storage to the host processor;

8    wherein the control processor is communicatively coupled to a control database;

9    wherein the second request is directed from the control processor to a storage

10        manager; ~~and~~

11    wherein the storage manager is communicatively coupled to the control processor, the

12        control database, and a storage network that includes the gateway device; and

13    the computer-readable medium further comprises one or more sequences of

14        instructions which, when executed by the one or more processors, cause the

15        one or more processors to carry out the step of the control processor causing

16        the storage manager to issue instructions to the one or more storage units to

17        give the host processor access to the one or more logical units.

1    44.    (Cancelled)

1    45.    (Currently Amended)  A computer-readable medium as recited in Claim 40, wherein

2           the request to allocate storage specifies a first amount of storage, and wherein the one

3           or more sequences of instructions for the control processor associating the one or more

4           logical units further comprise one or more sequences of instructions which, when

5           executed by the one or more processors, cause the one or more processors to carry out

6           the steps of:

7           the control processor identifying the one or more logical units (LUNs) of the one or

8                  more storage units that, when combined, have a ~~sufficient~~ second amount of

9                  storage ~~to satisfy~~ that is at least as great as the first amount of storage specified

10                in the request [[;]].

11         ~~the control processor instructing the gateway device to map the identified LUNs to the~~

12                ~~small computer system interface (SCSI) port zero of the host processor based~~

13                ~~on a unique processor identifier; and~~

14         ~~the control processor instructing the one or more storage units to give the host~~

15                ~~processor having the unique host identifier access to the identified LUNs.~~

 

1    46.    (Currently Amended)  A computer-readable medium as recited in Claim 40, wherein

2           the request is a first request, and the instructions for the control processor associating

3           the one or more logical units further comprise one or more sequences of instructions

4           which, when executed by the one or more processors, cause the one or more

5           processors to carry out the steps of:

6           the control processor issuing a second request to allocate one or more volumes on one

7                of the one or more storage units;

8           the control processor issuing a third request to make a concatenated volume using the

9                one or more allocated volumes;

10          the control processor causing the concatenated volume to be configured for use with

11               the host processor;

12          the control processor issuing first instructions to the one or more storage units to bind

13               the host processor to the concatenated volume by giving the host processor

14               access to the concatenated volume;

9

15         the control processor issuing second instructions to the gateway device to bind the

16                  concatenated volume to the host processor.

1    47.    (Previously Presented)  A computer-readable medium as recited in Claim 46, further

2         comprising one or more sequences of instructions which, when executed by the one or

3         more processors, cause the one or more processors to carry out the steps of:

4         the control processor determining that the second instructions have failed to bind the

5                  concatenated volume to the host processor;

6         the control processor issuing third instructions to the one or more storage units to

7                  un-bind the host processor from the concatenated volume;

8         the control processor determining that the first instructions have failed to bind the host

9                  processor to the concatenated volume; and

10        the control processor issuing fourth instructions to the one or more storage units to

11                break the concatenated volume.

1    48.    (Cancelled)

1    49.    (Currently Amended)  A computer-readable medium as recited in Claim 40, wherein:

2         the one or more logical units associated with the host processor include at least a first

3                  logical unit from a first volume of a first storage unit of the one or more

4                  storage units and at least a second logical unit from a second volume of a

5                  second storage unit of the one or more storage units;

6         the request to allocate storage specifies a parameter selected from the group consisting

7                  of an amount of storage to be allocated and a type of storage to be allocated;

8         the control processor is separate from the gateway device, the host processor, and the

9                  one or more storage units; and

10        the gateway device is separate from the control processor, the host processor, and the

11                one or more storage units.

1   50.   (Currently Amended)  An apparatus for allocating storage to a host processor, the

2   apparatus comprising a control processor that is configured to carry out the steps of:

3   receiving a request to allocate storage to the host processor; and

4   associating one or more logical units from among one or more storage units to the host

5   processor by:

6   configuring a gateway device to map the one or more logical units to the host

7   processor:

8   configuring the one or more storage units to give the host processor access to

9   the one or more logical units; and

10  wherein the host processor does not determine which one or more logical units are

11  associated with the host processor.

12  ~~wherein the control processor is separate from the gateway device, the host~~

13  ~~processor, and the one or more storage units; and~~

14  ~~wherein the gateway device is separate from the control processor, the host~~

15  ~~processor, and the one or more storage units.~~


1   51.   (Currently Amended)  An apparatus as recited in Claim 50, wherein:

2   ~~the configuring steps~~ configuring the gateway device and configuring the one or more

3   storage units are performed by the control processor without modification to an

4   operating system of the host processor;

5   the gateway device is included in a virtual storage layer;

6   the host processor and the one or more storage units are included in a virtual server

7   farm;

8   ~~the control processor configures the gateway device to map the one or more logical~~

9   ~~units to a boot port of the host processor;~~

10  the control processor is coupled through one or more storage networks to a plurality of

11  storage gateways that includes the gateway device; and

12  the plurality of storage gateways are coupled through the storage networks to the one

13  or more storage units.

1　52.　(Currently Amended)  An apparatus as recited in Claim 50, wherein the control

2　　　　processor is further configured to carry out the steps of:

3　　　　causing the storage of first information that associates processors to logical units;

4　　　　causing the storage of second information that associates logical units to storage units;

5　　　　　　~~and~~

6　　　　wherein the control processor being configured for associating <u>the one or more logical</u>

7　　　　　　<u>units from among the one or storage units to the host processor</u> further

8　　　　　　comprises configuring the control processor to carry out the step of mapping

9　　　　　　the one or more logical units from among the one or more storage units to a

10　　　　　boot port of the host processor by reconfiguring the gateway device to logically

11　　　　　couple the one or more logical units to the boot port based on the stored first

12　　　　　information and the stored second information<u>;</u>

13　　　　<u>the control processor identifying one or more logical unit numbers (LUNs)</u>

14　　　　　　<u>corresponding to the one or more logical units;</u>

15　　　　<u>the control processor instructing the gateway device to map the one or more LUNs to</u>

16　　　　　　<u>the small computer system interface (SCSI) port zero of the host processor</u>

17　　　　　　<u>based on a unique processor identifier; and</u>

18　　　　<u>the control processor instructing the one or more storage units to give the host</u>

19　　　　　　<u>processor having the unique host identifier access to the one or more LUNs.</u>

1　53.　(Currently Amended)  An apparatus as recited in Claim 50, <u>wherein the request to</u>

2　　　　<u>allocate storage to the host processor is a first request to allocate storage to the host</u>

3　　　　<u>processor, and</u> wherein the control processor is further configured to carry out the step

4　　　　of:

5　　　　generating ~~the~~ <u>a second</u> request to allocate storage <u>to the host processor, based on the</u>

6　　　　　　<u>first request;</u>

7　　　　wherein the control processor is communicatively coupled to a control database;

8　　　　wherein the <u>second</u> request is directed from the control processor to a storage

9　　　　　　manager; ~~and~~

| | | |
|---|---|---|
| 10 | | wherein the storage manager is communicatively coupled to the control processor, the |
| 11 | | control database, and a storage network that includes the gateway device; |
| 12 | | the control processor is further configured to carry out the step of causing the storage |
| 13 | | manager to issue instructions to the one or more storage units to give the host |
| 14 | | processor access to the one or more logical units. |

| | | |
|---|---|---|
| 1 | 54. | (Cancelled) |

| | | |
|---|---|---|
| 1 | 55. | (Currently Amended)  An apparatus as recited in Claim 50, wherein the request to |
| 2 | | allocate storage specifies a first amount of storage, and wherein the control processing |
| 3 | | being configured for associating the one or more logical units further comprises |
| 4 | | configuring the control processor to carry out the steps of: |
| 5 | | the control processor identifying the one or more logical units (LUNs) of the one or |
| 6 | | more storage units that, when combined, have a ~~sufficient~~ second amount of |
| 7 | | storage ~~to satisfy~~ that is at least as great as the first amount of storage specified |
| 8 | | in the request [[;]]. |
| 9 | | ~~instructing the gateway device to map the identified LUNs to the small computer~~ |
| 10 | | ~~system interface (SCSI) port zero of the host processor based on a unique~~ |
| 11 | | ~~processor identifier; and~~ |
| 12 | | ~~instructing the one or more storage units to give the host processor having the unique~~ |
| 13 | | ~~host identifier access to the identified LUNs.~~ |

| | | |
|---|---|---|
| 1 | 56. | (Currently Amended)  An apparatus as recited in Claim 50, wherein the request is a |
| 2 | | first request, and configuring the control processor for associating the one or more |
| 3 | | logical units further comprises configuring the control processor to carry out the steps |
| 4 | | of: |
| 5 | | issuing a second request to allocate one or more volumes on one of the one or more |
| 6 | | storage units; |
| 7 | | issuing a third request to make a concatenated volume using the one or more allocated |
| 8 | | volumes; |
| 9 | | causing the concatenated volume to be configured for use with the host processor; |

10        issuing first instructions to the one or more storage units to bind the host processor to

11              the concatenated volume by giving the host processor access to the

12              concatenated volume;

13        issuing second instructions to the gateway device to bind the concatenated volume to

14              the host processor.


1    57.    (Previously Presented)  An apparatus as recited in Claim 56, wherein the control

2          processor is further configured to carry out the steps of:

3          determining that the second instructions have failed to bind the concatenated volume

4              to the host processor;

5          issuing third instructions to the one or more storage units to un-bind the host processor

6              from the concatenated volume;

7          determining that the first instructions have failed to bind the host processor to the

8              concatenated volume; and

9          issuing fourth instructions to the one or more storage units to break the concatenated

10              volume.


1    58.    (Cancelled)


1    59.    (Currently Amended)  An apparatus as recited in Claim 50, wherein:

2          the one or more logical units associated with the host processor include at least a first

3              logical unit from a first volume of a first storage unit of the one or more

4              storage units and at least a second logical unit from a second volume of a

5              second storage unit of the one or more storage units;

6          the request to allocate storage specifies a parameter selected from the group consisting

7              of an amount of storage to be allocated and a type of storage to be allocated;

8          the control processor is separate from the gateway device, the host processor, and the

9              one or more storage units; and

10          the gateway device is separate from the control processor, the host processor, and the

11              one or more storage units.

1   60.   (New) A method as recited in Claim 1, wherein the host processor does not know

2          which one or more logical units are associated with the host processor.

1   61.   (New) A method as recited in Claim 1, wherein:

2          the one or more logical units are associated with one or more logical unit numbers

3              (LUNs); and

4          the host processor does not know the one or more LUNs for the one or more logical

5              units that are associated with the host processor.

1   62.   (New) A method as recited in Claim 1, wherein:

2          the host processor is a first host processor;

3          the one or more logical units include a first logical unit and a second logical unit;

4          the one or more storage units include a first storage unit and a second storage unit;

5          the first logical unit is associated with the first storage unit;

6          the second logical unit is associated with the second storage unit;

7          the control processor associates the first logical unit and the second logical unit to the

8              first host processor at a first time; and

9          the method further comprises:

10         at a second time that is after the first time, the control processor associating the second

11             logical unit with a second host processor by:

12             the control processor configuring the gateway device to map the second logical

13                 unit to the second host processor instead of the first host processor;

14             the control processor configuring the second storage unit to give the second

15                 host processor access to the second logical unit instead of the first host

16                 processor;

17             wherein the second host processor does not determine that the second logical

18                 unit is associated with the second host processor;

19             wherein the first logical unit remains associated with the first host processor;

20         at a third time that is after the second time, the control processor associating the

21             second logical unit with the first host processor by:

22             the control processor configuring the gateway device to map the second logical

23                    unit to the first host processor instead of the second host processor;

24             the control processor configuring the second storage unit to give the fist host

25                    processor access to the second logical unit instead of the second host

26                    processor;

27             wherein the first host processor does not determine that the second logical unit

28                    wherein the first host processor does not determine that the second

29                    logical unit is associated with the first host processor; and

30             wherein the first logical unit remains associated with the first host processor.

1    63.    (New)  A computer-readable medium as recited in Claim 40, wherein the host

2            processor does not know which one or more logical units are associated with the host

3            processor.

1    64.    (New)  A computer-readable medium as recited in Claim 40, wherein:

2            the one or more logical units are associated with one or more logical unit numbers

3                   (LUNs); and

4            the host processor does not know the one or more LUNs for the one or more logical

5                   units that are associated with the host processor.

1    65.    (New)  A computer-readable medium as recited in Claim 40, wherein:

2            the host processor is a first host processor;

3            the one or more logical units include a first logical unit and a second logical unit;

4            the one or more storage units include a first storage unit and a second storage unit;

5            the first logical unit is associated with the first storage unit;

6            the second logical unit is associated with the second storage unit;

7            the control processor associates the first logical unit and the second logical unit to the

8                   first host processor at a first time; and

9             the computer-readable medium further comprises one or more sequences of

10                 instructions which, when executed by the control one or more processors,

11                 cause the one or more processors to carry out the steps of:

12            at a second time that is after the first time, the control processor associating the second

13                   logical unit with a second host processor by:

14                   the control processor configuring the gateway device to map the second logical

15                        unit to the second host processor instead of the first host processor;

16                   the control processor configuring the second storage unit to give the second

17                        host processor access to the second logical unit instead of the first host

18                        processor;

19                   wherein the second host processor does not determine that the second logical

20                        unit is associated with the second host processor;

21                   wherein the first logical unit remains associated with the first host processor;

22    at a third time that is after the second time, the control processor associating the

23                   second logical unit with the first host processor by:

24                   the control processor configuring the gateway device to map the second logical

25                        unit to the first host processor instead of the second host processor;

26                   the control processor configuring the second storage unit to give the fist host

27                        processor access to the second logical unit instead of the second host

28                        processor;

29                   wherein the first host processor does not determine that the second logical unit

30                        wherein the first host processor does not determine that the second

31                        logical unit is associated with the first host processor; and

32                 wherein the first logical unit remains associated with the first host processor.

1   66.   (New) An apparatus as recited in Claim 50, wherein the host processor does not know

2        which one or more logical units are associated with the host processor.

1   67.   (New) An apparatus as recited in Claim 50, wherein:

2        the one or more logical units are associated with one or more logical unit numbers

3             (LUNs); and

4        the host processor does not know the one or more LUNs for the one or more logical

5             units that are associated with the host processor.

1    68.    (New)  An apparatus as recited in Claim 50, wherein:

2        the host processor is a first host processor;

3        the one or more logical units include a first logical unit and a second logical unit;

4        the one or more storage units include a first storage unit and a second storage unit;

5        the first logical unit is associated with the first storage unit;

6        the second logical unit is associated with the second storage unit;

7        the control processor associates the first logical unit and the second logical unit to the

8            first host processor at a first time; and

9        the control processor is further configured to carry out the steps of:

10        at a second time that is after the first time, associating the second logical unit with a

11            second host processor by:

12            configuring the gateway device to map the second logical unit to the second

13                host processor instead of the first host processor;

14            configuring the second storage unit to give the second host processor access to

15                the second logical unit instead of the first host processor;

16            wherein the second host processor does not determine that the second logical

17                unit is associated with the second host processor;

18            wherein the first logical unit remains associated with the first host processor;

19        at a third time that is after the second time, associating the second logical unit with the

20            first host processor by:

21            configuring the gateway device to map the second logical unit to the first host

22                processor instead of the second host processor;

23            configuring the second storage unit to give the fist host processor access to the

24                second logical unit instead of the second host processor;

25            wherein the first host processor does not determine that the second logical unit

26                is associated with the first host processor; and

27            wherein the first logical unit remains associated with the first host processor.